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Crawfish Farming
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FARMLINE

Volume II
Number 11

December 1981

FEATURES

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PERSPECTIVES

This month's cover story, "Bumper Crops, Lean Prospects," isn't very encouraging. However, there are still many "if's" that can't be ruled out. For example, if inflation and interest rates ease rapidly, if our economy rebounds by summer, if harvests are smaller next year, if exports are boosted by stronger economic growth and poor crops abroad, then 1982 might not be such a bad year overall.

Record interest rates on rising farm debt have offset the slowdown in other production costs, but interest rates have also shown some moderation lately. Production costs may rise 6%-9% in 1982. This year and last, they rose about 9%. Cash receipts may rise 4%-6%. This year, they rose about 5%, last year 3%. These forecasts point to three straight years of production costs rising faster than cash receipts, adding to farmers' cash flow bind.

But current commodity price forecasts (see cover story) are chancy, leaving a wide margin for cash receipt prospects. For example, 20¢ a bushel in the price of corn could mean a difference of about a billion dollars--up or down--in overall farm receipts. So could 50¢/bu. for soybeans, 40¢/bu. for wheat, 17¢/cwt. for cotton, $2/cwt. for cattle, $4.25/cwt. for hogs, or 6¢/lb. for broilers.

While crop prices in the first half aren't likely to match the strong prices of early this year, the second half remains a question mark. Prices could rise sharply if it looks like 1982 crops won't equal this year's records. But even under the best conditions, no one expects a big improvement in 1982 net farm income. Many farmers have put off capital expenditures for two successive years, so gains in cash receipts next year may be plowed back into new machinery, equipment, and other production inputs.

Bullish export prospects partly reflect lower crop prices, but they're also keeping prices from falling further. Our farm export volume could hit a record 180 million tons, up 17 million from fiscal 1981. Soviet imports are likely to account for a big share of the gain. It's too soon to say how much export competition we'll face. Southern Hemisphere wheat harvests are now in progress, and feed grain and oilseed crops are harvested next March-May.

It's a bit early to estimate U.S. plantings, but analysts expect farmers to seed slightly less wheat, especially in the Southeast, because of the acreage reduction program. They also look for more feed grains and sunflowers and a small reduction from 1981 in soybean and cotton acreage.

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U.S. farmers face lean economic prospects through 1982 due to bumper crops and a continued sluggish U.S. and world economy. Some improvement is likely during the second half of next year, but the overall farm income outlook isn't very promising.

Family Farms Under Stress by *Eric Van Chantfort* 7

Family farms are under considerable stress, and the explanation goes deeper than troubled times. According to economist Neal Peterson, many of the adjustments that have transformed U.S. agriculture have left farmers more vulnerable to unexpected change.

Crawfish Farmers Tap Growing Gourmet Market by *Sherrie Meyer* 12

Crawfish suggest fishbait—not gourmet dining—to most Americans. But it's on the plate, not on the hook, where the lobster-like crustacean is building a reputation as a promising cash crop for some southern farmers.

How Effective Are Marketing Orders? by *Ellen Banker* 13

It isn't everyday that producers defend government regulation, but many fruit and vegetable growers have done just that in response to criticism of federal marketing orders. Economist Ed Jesse says marketing orders may be getting more credit—and criticism—than they deserve.

U.S. Cotton Helps Fuel Asian Textile Boom by *Barry Murray* 14

Textile manufacturing is still viewed as a road to industrialization by many developing Asian nations that rely on the U.S. as their major supplier of cotton. In 1980, Asian markets took more than 80 percent of all U.S. cotton exports.

For Many Water Users, An Era of Ccnservation Begins by *Bill Gordon* 16

Declining ground water levels, growing competition from industries and cities, and rising pumping costs are forcing irrigators to break old habits and think conservation. But many growers in water-short areas can't help wondering how much longer there will be enough to go around.

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Bumper Crops, Lean Prospects

American farmers face lean economic prospects through 1982 due to bumper crops and a continued sluggish U.S. and world economy.

"There is little evidence of a good year for farm income in 1982," said economist George Hoffman at last month's Agricultural Outlook Conference in Washington, D.C. Hoffman is acting deputy administrator of USDA's Economic Research Service.

Although neither Hoffman nor other USDA officials projected specific 1982 net farm income—too many uncertainties exist—they saw little reason for optimism, at least through mid-1982. But some improvement is expected during the second half of the year.

Considering the farm economy in 1981, another decline would be a blow to many farmers—especially those with large outstanding loans and slim prospects for rescheduling debt. Here are some of the preliminary 1981 estimates:

- Net farm income before inventory adjustment will be around $19 billion this year, a decline of $2.9 billion from 1980. But adjusted to include increases in the value of farm inventories, net farm income will be about $22 billion, up $2.1 billion from 1980.
- Cash receipts are expected to be up about 5 percent over 1980, with crop receipts rising 7 percent to $74 billion, and livestock receipts up 4 percent to $70 billion.
- However, cash expenses and total production costs should be up about 9 percent. Record interest rates on the growing farm debt should more than offset the slowdown in other production costs.
- Net income from farm sources, before inventory adjustment, should average about $7,950 per farm, compared with $9,002 in 1980. With off-farm income added, total income per farm may just top $24,000—second only to 1979's $24,923.

Major Unknowns

Hoffman noted three major unknowns which could change 1982 farm income prospects. First, the size of Southern Hemisphere harvests could drive U.S. farm prices up or down.

Secondly, as the 1982/83 harvest nears, prices will adjust according to prospective world supplies.

Finally, the strength of the U.S. and world economies will affect demand as consumers have more or less money to bid for agricultural goods.

Preliminary projections for 1982 are strongly influenced by huge 1981 world crop and livestock production coming in a time of relatively weak demand:

- Farm production expenses may moderate to a 6 to 9 percent gain next year, the smallest increase since 1975.
- Cash receipts are expected to be up only 4 to 6 percent, a smaller gain than even the expected modest jump in production expenses. This could add to many producers' cash flow squeeze.

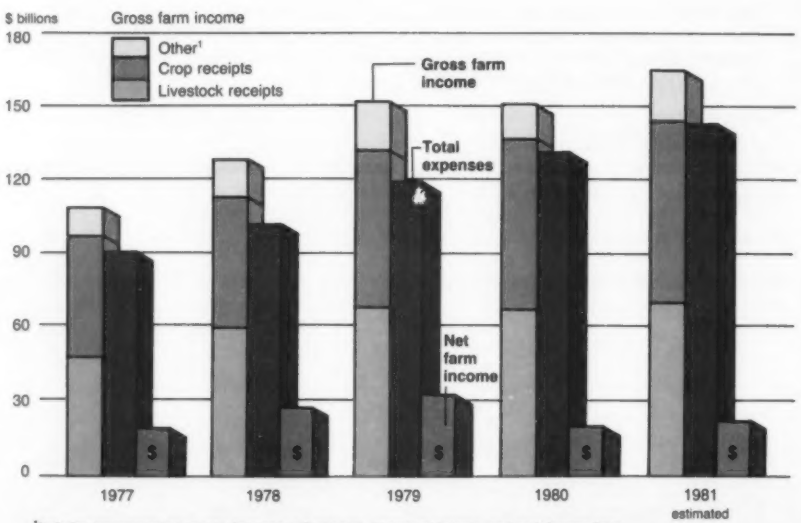
Some improvement is expected during the second half of next year.

- If this squeeze continues, many farmers will need to reschedule debt and defer capital expenditures for the third consecutive year.

Despite financial pressures in 1981, most farmers were able to meet their debt obligations, according to USDA economist David A. Lins.

"While many lenders indicate no significant increase in loan collection problems, there is almost unanimous concern over what might happen if farm incomes do not improve soon," Lins said. "Lenders believe that unless incomes improve soon, the problems of delin-

Production Costs Rise Faster Than Farm Receipts, Leaving Only a Small Gain in 1981 Net Farm Income



[1]Includes government payments, inventory adjustments, nonmoney income, and cash income from such sources as machine hire and custom farm work.

quency and default will increase significantly."

Lins offered these 1982 outlooks:

- Ample credit should be available to qualified borrowers, as it was in 1981.
- If the Federal Reserve maintains a moderate growth rate in the money supply, a gradual easing in interest rates should continue. In 1981, interest rates reached record highs, with bank farm loans hitting 19 to 20 percent last August.
- If the 1982 overall inflation rate ranges from 8 to 10 percent, a continued reduction in the real wealth position of the farm sector is anticipated.

"If this forecast materializes," Lins said, "it will be the first time in the last 40 years that the real wealth of the farm sector has declined for 3 consecutive years."

Retail Prices Ease

On the other end of the food chain, overall food prices are projected to rise around 7 percent in 1982, compared with about 8.2 percent in 1981, according to USDA economists R. McFall Lamm and Paul C. Westcott. Grocery store food prices are likely to rise about 6 percent, while food prices in restaurants go up about 8 percent.

"The farm value of domestic food production will probably rise only about 1 to 4 percent," they said. "In stark contrast, food marketing costs will rise 8 to 10 percent and be the major source of food price inflation in 1982."

Turning to individual commodities, USDA experts say that, for many items, world stocks are so high that farm prices have faltered:

Feed Grains. A year ago, economists worried that poor worldwide production had drawn down stocks to a dangerous level—a small 1981 feed grain harvest could have meant serious shortages.

This year, the worry is just the opposite: too much grain. In fact, USDA economists James P. Rudbeck and Paul J. Meyers expect 1981/82 world coarse grain production to be a record 766 million metric tons (mmt.), 18-19 million above projected world utilization.

Of course, not all countries did equally well. While U.S. farmers harvested about 246 million tons of coarse grains (206 mmt. of corn) this year, the USSR suffered its third consecutive poor harvest.

World coarse grain trade this season is projected at 115.6 mmt., of which the U.S.—holding better than half the world stocks—should account for 72 mmt., up slightly over the 1980/81 export level.

Domestic feed use should be up 6 percent this season to further ease the supply, but, even so, stocks should build 18 mmt. this season to a total of 53 mmt.—about matching 1979/80's ending stocks.

The Inventory Adjustment Factor

What's the USDA net farm income forecast for 1981? The answer is either $19 billion or $22 billion, depending on whether expected farm inventory changes are included in calculations.

This year, net farm income after inventory adjustment is higher. The reason: Record crops are raising producer-held inventories over year-earlier levels, adding $3 billion to the $19 billion pre-inventory adjustment figure.

Is net farm income up or down from last year? It depends. Comparing figures before inventory adjustments, 1981 net farm income is forecast at about $3 billion less than the $21.9 billion for 1980. But after inventory adjustments, this year's income is forecast at about $2 billion higher than last year's $19.9 billion.

Inventory adjustments have been highly variable in recent years. The 1980 drought forced a drawdown of farm inventories from large 1979 levels. The negative $2 billion inventory adjustment figure in 1980 lowered net farm income from $21.9 billion before inventory adjustment to $19.9 billion after adjustment.

In 1979, the inventory adjustment was a positive $5.3 billion and helped to push that year's net farm income to a record $32.7 billion.

Why is the inventory adjustment figured in at all? Although this year's expected $3 billion inventory gain isn't cash in producers' pockets, it would have been if marketed. Therefore, it represents income from the 1981 crop which offsets production expenses incurred in raising it.

Although no single measure can adequately describe the economic condition of all farms, both figures—before and after inventory adjustments—offer some insight into the financial well being of the farm sector.

Net Farm Income, Before and After Inventory Adjustment

	1979	1980	1981[1]
	billion dollars		
Before inventory adjustment:	27.4	21.9	19
Inventory change:	+5.3	-2.0	+3
After inventory adjustment	32.7	19.9	22

[1] Projected

When the size of the corn crop became apparent, farm prices fell from $3.17 per bushel in June to $2.42 in October. Other feed grain prices followed. The mid-November outlook for the 1981/82 crop year is for corn prices to average $2.55-$2.80 per bushel, down from last season's record $3.10.

Food Grains. This season's world food grain harvests were so abundant that gains in production of 2.4 percent will not only cover growth in consumption, but should also allow for some minor stock buildup, said USDA economist John C. Dunmore. The record U.S. wheat crop of 74.8 mmt. is a major factor in this abundance.

Major wheat exporters, including the U.S., Australia, and Canada, enjoyed gains in production averaging almost 11 percent. Of all major exporters, only the European Community had a smaller crop, while Argentina's crop is now forecast to be at about last year's level.

Meanwhile, major importers, including Eastern Europe, the USSR, China, Brazil, North Africa, and Spain, averaged a 6.8 percent smaller crop. Only China showed a gain among major importers.

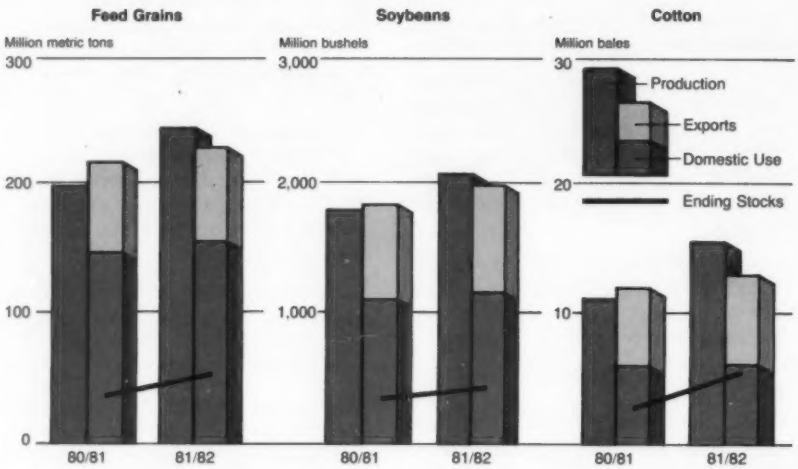
Result: world wheat trade should be up from last season's 98 mmt. The forecast: 98.5-108.7 mmt.

Beef Cattle. High expectations among cattle producers for 1981 meat prices soured as the economy slowed, interest rates rose, and consumer budgets tightened.

The outlook is for continuing slow beef price gains through mid-1982, although lower feed costs, moderating interest rates, and improved forage conditions should restrain production costs. Beef production should rise 3 to 4 percent in 1982 as the herd expansion continues, said USDA livestock economist Ronald A. Gustafson.

Pork. After declining about 6 percent in 1981 from record 1980 output of 16.4 billion pounds, pork production is expected to decline another 4 to 6 percent next year. Even so, supplies should still be ample—especially with high production of competing meats and with sluggish consumer demand.

U.S. Stocks Will Build As This Year's Bumper Harvests Push Production Above Prospective Use[1]



[1]Based on mid-November data.
1980/81 estimated. 1981/82 projected.

Second-half 1981 hog prices were up sharply from the low levels of January-June 1981. Prices to producers are expected to strengthen in 1982, and the average price of barrows and gilts may range from $46 to $50 per cwt., said USDA livestock analyst James E. Nix.

Poultry. The record feed grain crop should also benefit poultry and egg producers in 1982, easing pressures from the expected weak poultry and egg prices during the first half of next year.

Broiler producers are expected to expand output by about 1 percent, but egg production may decrease slightly, and turkey production could decline 4 to 6 percent, according to USDA economist Allen Baker.

Oilseeds. Like grain crops, U.S. oilseeds production for 1981/82 was so abundant that supplies are depressing farm prices.

The soybean harvest was about 2.1 billion bushels, up 16 percent from the drought-reduced 1980/81 total, according to USDA economist Sam Evans. With such large supplies, the season average price may be only $5.75-$6.75, down sharply from the $7.61 average for 1980/81. These larger supplies and lower prices should push utilization up 9 percent to about 2 billion bushels.

This large crop should enable the U.S. to capture up to 80 percent of world soybean trade this year, Evans said. This season's exports are forecast at 830 million bushels, 15 percent over the 1980/81 season total. □

*[Based on speeches presented at USDA's **Agricultural Outlook Conference** held Nov. 2-5 in Washington, D.C.]*

Family Farms Under Stress

Strength, diversity, productivity... proverbial hallmarks of the American system of family farms.

Still true in these troubled times?

"About 98 percent of our farms are still family-run operations, and they're more productive than ever, that's true," says Neal Peterson. Peterson is an economist with USDA's Economic Research Service and one of the authors of the latest report to Congress on the status of U.S. family farms.

"Total U.S. farm output set a new record in 7 of the last 10 years, 1981 included," he adds.

"In general, it's also true that farm families can afford a much higher standard of living than they could 10 or 20 years ago when their incomes consistently lagged far behind the U.S. average."

But Peterson says that such boasts do little to explain how the dramatic adjustments of recent decades have affected farmers' ability to cope with today's uncertainties—or those in the years ahead.

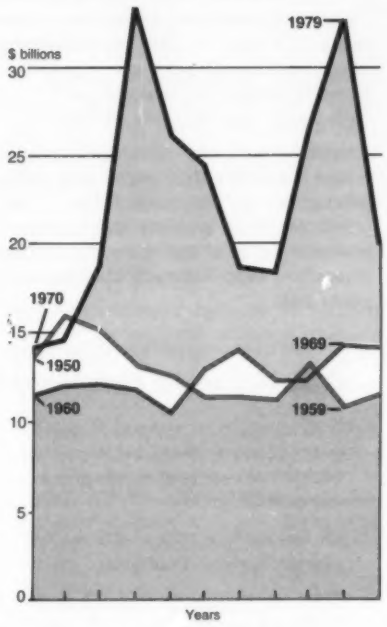
"Family farms are in a period of considerable stress, and the adjustments that have transformed U.S. agriculture are as much a part of the explanation as any of the immediate causes."

He points particularly to farmers' growing dependence on factors outside their control: growing dependence on export demand, credit, supplies of fuel and other purchased inputs, rising land values, off-farm employment and the strength of the general economy, even market prices as individual producers specialize in a narrower mix of commodities.

"Many of these adjustments have left farmers more vulnerable to unexpected change," he says. "The result may be that the good years are going to be better, and the bad years may be worse."

In a similar way, the entire food and fiber production system has become more dependent—concentrated on fewer, larger, and more specialized farms.

Net Farm Income*: From the Comparatively Stable 1950's and 1960's to the Erratic 1970's



*Net farm income after inventory adjustment.

The Unpredictability Factor

Of course, all these changes have brought significant benefits to many producers and have left us with a food production system that feeds hundreds of millions here and abroad. But change has also brought a new unpredictability to the farm picture.

According to Peterson, this unpredictability is partly reflected in sharp fluctuations in farm income.

In the 1950's and 1960's, net farm income was fairly stable. Over the entire 20 years, it stayed within a $5½ billion range, varying from a low of $10½ billion to a high of $16 billion. Year-to-year fluctuations never exceeded $2½ billion.

Since then, the ups and downs have been severe by comparison—the low was $14 billion in 1970 and the high more than $33 billion in 1973 when exports and prices soared. The record income of 1973 encouraged farmers to enlarge their operations and brought others into farming. As farm income dropped in subsequent years—to below $19 billion in 1976 and 1977—many producers suffered serious losses.

Then, net farm income jumped $8 billion in 1978 and another $6 billion in 1979 to nearly match 1973's record—again raising expectations of continued strong returns. But, in 1980, income plunged almost $13 billion to just under $20 billion, and this year's estimated $22 billion isn't much better.

Although each year has its own unique combination of circumstances, much of the variability in net farm income since the early 1970's can be related to our growing dependence on world markets, Peterson says.

Exports have provided an expanding outlet for U.S. farmers, encouraging greater production and boosting farm incomes since the 1960's. But they've also added to unpredictability and risk.

"World demand is more erratic than domestic demand," he says. "Consequently, our growing dependence on exports has increased the fluctuations in farm prices and income."

Measures of our heavy reliance on export sales are easy to come by. An estimated 31 of every 100 bushels of this year's corn crop will go to foreign markets, compared with only 12 of every 100 bushels in 1970.

Similarly, about 69 percent of the wheat harvest and 45 percent of U.S. cotton will be sold abroad. In 1970, the figures were 55 percent for wheat and 38 percent for cotton. About the same share of our soy-

bean crop will be exported as in 1970—55 percent—but total sales volume has doubled.

The Vulnerability Factor

If some of the adjustments in U.S. agriculture have added to farm income variability, others have made many farmers more vulnerable to these fluctuations, according to Peterson.

"One of the major virtues of our family farm system has been its ability to absorb low income years and bounce back without serious hardship," he says. "But this assumes high equity, relatively stable costs of production, and diverse crop and livestock mixes—not an altogether accurate image of the current farm situation."

Rising debt loads, inflation, the emphasis on production volume, and the trend to specialization have left farmers less able to cope with the bad years, he adds.

Total farm debt has more than tripled since 1970, from $53 billion to $175 billion on January 1, 1981. Although debts as a percentage of farm assets have remained fairly stable overall, debt repayments are taking a progressively bigger bite out of farm receipts.

Interest expenses now comprise about 13 percent of farmer's total production costs, up from around 7½ percent 10 years ago. This tends to make capital gains less important than adequate cash flow.

"Many farms are deeply in debt, and interest rates are so high that it's very hard to refinance," Peterson says.

Heavy dependence on credit reflects a number of factors: pressures to expand, high land costs, inflation's impact on production and living expenses, and greater reliance on volume-boosting equipment and other purchased inputs.

Established farmers can fall back on steadily rising land values to finance capital expenditures and farm expansion, but that, too, can be "shaky ground," according to Peterson.

"As dependent as farmers are on debt expansion, many would be in big trouble if farm incomes were low and land values stabilized or declined for a few years," he says. It may be happening now. Analysts already see signs of a slowdown from the rapid appreciation in land values typical of the 1970's.

Another important development with mixed implications for the farm sector is production specialization. The larger farms of today typically depend on a narrower range of commodities than the diversified crop-livestock operations of years past.

While specialization often boosts efficiency and production potential, it also means greater risks for the individual producer from weather, disease, insects, or low prices.

Economic Integration

Dependence on exports, credit, industrial inputs, rising land values, even specialization all suggest closer ties between agriculture and the world outside the rural farm sector. Farmers are linked as never before to developments and economic prospects here and abroad.

This has been a source of strength as well as vulnerability, Peterson says. The rural nonfarm economy grew rapidly in

Coping with the New Vulnerability

The adjustments in the farm sector over recent decades have created both a new responsiveness and a new vulnerability.

It's the vulnerability that concerns economist Neal Peterson.

"The result may be that the good years are going to be better, and the bad years may be worse," he says. "An important question is how you transfer income from the good times to the bad."

The last few years add some urgency to his point. For overall farm income, this year of record crops will be little better than the 1980 drought year. Of course, this doesn't mean that all farmers are hurting, nor does it mean that the same farmers suffered in both years. Some have done much better than others.

However, many farmers are in a severe cash flow squeeze as their production expenses have risen faster than cash receipts for the second consecutive year.

"We haven't seen as bad a period in a long time, but a lot depends on the individual producer's equity," Peterson says.

"Some farmers will go through the wringer and cut back their operations or get out of farming. Those who don't will pick up the resources the others will lose."

In the past, pressures on the farm sector resulted in agricultural resources being concentrated among fewer producers, with overall gains in farm income and production efficiency. But that may no longer be the case.

"I don't see any benefits in today's weeding-out process because it's not just the so-called inefficient producers who are suffering. The biggest losers are apt to be those carrying the heaviest debts."

Although location, size, and product make a world of difference, those hurt worst by the current crunch are often the younger farmers just getting started and farmers who have been aggressively expanding their operations, according to Peterson.

The farm sector's overall dependence on the nonfarm economy has both risks and rewards.

the 1970's, offering farm families a greater variety of income options than ever before. Outside earnings have helped many make it through years of low farm income.

Average off-farm earnings per farm operator family rose from $5,899 in 1970 to $13,667 in 1979—a 132-percent increase. During the same period, average farm-generated income rose 135 percent (partly reflecting fewer farms)—from $4,797 to $11,256. In 1980, however, when average farm income per family fell $2,254, off-farm earnings rose another $1,153.

By the late 1970's, the combination of farm and off-farm earnings provided the average member of the farm population with a total income on a par with that of nonfarmers—only 4 percent below nonfarmers in 1978 and 2 percent above in 1979. Although per capita income for the farm population lost ground in 1980—falling back to 82 percent of nonfarm income—it was still well above 1970's 73 percent and 1960's 53 percent.

Today, families operating larger farms (those with annual sales of $40,000 or more) depend on farm-generated earnings for two-thirds to three-fourths of total income. Operators of smaller farms get most of their income from off-farm jobs.

"Off-farm income has fostered a more equitable distribution of income within the farm sector and has also helped stabilize the farm economy when commodity prices fluctuate," Peterson says.

He points out, however, that the farm sector's overall dependence on the nonfarm economy can have its risks as well as its rewards—especially for farm families who depend on off-farm jobs to get them through periods of low farm prices.

"In the past, the farm economy and the general economy often went in opposite directions," he says. "That may not be the case in the future. Right now, for example, we're facing low farm prices and rising unemployment in the industrial sector, possibly jeopardizing some off-farm jobs."

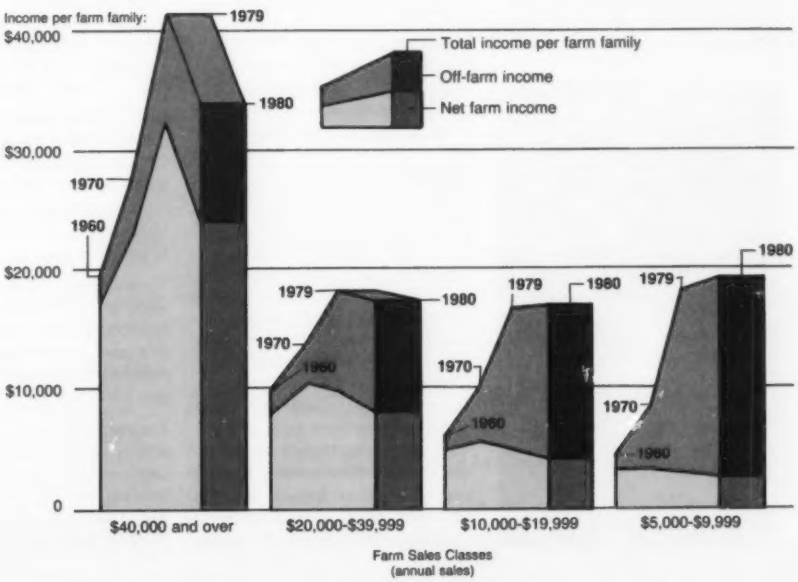
Of course, the economic relationships go far beyond off-farm jobs. Farm inputs markets are more integrated with national markets, and farmers have to compete with nonfarmers for use of limited resources. For instance, high prices and occasionally tight supplies of petroleum products have sometimes disrupted farm operations.

Similarly, farmers' reliance on exports means that anything affecting trade—a weak world economy or foreign policy decisions—now has significant implications for farm income. So do inflation and domestic economic policies that affect consumer demand, interest rates, or the foreign exchange value of the dollar. One result: The farm economy suffers, too, when the rest of the economy isn't healthy.

But the dependency works both ways. For example, farm trade makes a major contribution to the U.S. balance of payments—we registered an agricultural trade surplus of about $27 billion in fiscal 1981. Agriculture's role has focused greater attention on its importance to the economy, and has probably helped farm analysts and policymakers become better attuned to the diverse needs of family farms, Peterson says. □

[Based on an interview with ERS economist Neal Peterson and materials in USDA's fourth annual report on the status of family farms, ***Farm Organization and Performance in the 1970's****, by George Coffman, Linda Calvin, Neal Peterson, and Nora Brooks.]*

Off-Farm Earnings Account For a Growing Share of Farm Family Income, Especially on Smaller Farms



AGRICULTURAL ROUNDUP

Christmas: A $300 Million Harvest

Christmas is a $300 million a year business for some 12,000 producers who grow natural evergreens for the U.S. Christmas tree market.

They've met the challenge of fading sales when artificial trees were in vogue, and now evergreens are increasing in popularity.

Sales have been gradually climbing over the past 5 years according to Jane Suinicki of the American Christmas Tree Association. "Americans may buy about 30 million trees this year," Suinicki says. "That's up about 2 million from a year ago."

Most Christmas trees are grown on sandy soil ideally suited for evergreens but of little value for other crops. They don't pose any competition to commercial timber operations because Christmas trees are valued for different reasons. For example, the ideal commercial forest tree is fast growing with a tall, straight stem and as few branches as possible—extra branches mean more knots and wasted cellulose.

"On the other hand," Suinicki says, "the ideal Christmas tree grows slowly, is thick and full with many branches, and has a distinctive triangular silhouette." To the Christmas tree grower, color and form are far more important than strength. Pleasant odor is also valued, as is the tree's ability to remain fresh for weeks following harvest.

Although the natural Christmas tree comes in about 40 varieties, only half a dozen evergreen species make up more than 75 percent of all commercially developed trees. The big leaders—the Balsam fir, Scotch pine, Douglas fir, cedar, spruce, and red pine—are followed by other popular varieties, the Austrian pine, noble fir, and White pine.

Christmas trees are grown in almost every state, but Michigan, Oregon, Wisconsin, and Washington lead production.

Most Christmas trees begin life in a nursery where the seed is grown to 2-year-old seedlings. Then, the seedlings are usually taken from the nursery beds and replanted on a 5-foot grid pattern.

Each year, the young trees are shaped or pruned. By holding back rapid upward growth, the grower can encourage the tree to branch more thickly and gradually achieve the bushy appearance people seem to prefer. Depending on the type of evergreen, trees are ready for harvest anywhere from 6 to 12 years after they're planted.

Besides tending the crops in the ground, the tree grower must also be concerned with the future. Research is a prime concern at labs run by various universities such as Louisiana State and Michigan State, where specimens of evergreens from all over the U.S. and some foreign countries are studied. Researchers analyze the trees' natural growth potential and their response to various cultivation and cosmetic practices.

The long-term goal is to find a species or a strain that develops the desired shape, size, and texture naturally and has good keeping qualities, desirable color, and pleasant odor.

In the meantime, Christmas tree crews from all over the U.S. care for the nation's 450,000 acres of Christmas tree farms by hand. It's a big job, and almost 100,000 workers are involved in some way. And, it's big business. The wholesale value of the crop is about $300 million, but the retail value is around $600 million.

Census Says Farmers Younger

The number of U.S. farms is still declining and average farm size still growing, but both trends seem to have slowed since the 1960's and early 1970's.

Farm numbers declined at an annual rate of only six-tenths of 1 percent between 1974 and 1978, compared with 4 percent a year between 1969 and 1974.

These are only a couple of the recent changes in the U.S. farm sector, according to analysts reviewing preliminary data from the 1978 Census of Agriculture.

One major reversal of past trends: a drop in the average age of U.S. farmers, the first in decades. From 1950 to 1974, the average age rose from 48 to nearly 53. In the 1978 census, it declined to just above 50.

"Average age will probably continue to drop," says USDA economist Neal Peterson. "We're in a period of intergenerational transfer that will probably last for a few decades."

The fact that many farmers are now entering retirement age may partly explain the rise in tenant farming, the first time tenancy has increased since the 1930's. From 1974 to 1978, tenant farms increased to 12 percent of total farms with sales of $2,500 or more.

With the rapid appreciation in land values in recent years, many owners are reluctant to sell, even when they're scaling back their operations. Renting their land is often a preferred alternative. Likewise, the high price of land and high interest rates combine to make rental more feasible for young people just entering farming.

Still another finding: The number of incorporated farms nearly doubled between 1974 and 1978, but Peterson stresses: "These figures don't mean that farming is being taken over by the executive boardroom."

Incorporated farms still account for only about 2 to 3 percent of all farms, and 90 percent of corporate farms are family operated—most with fewer than 10 shareholders.

"Nearly half of all farm corporations have sales of less than $100,000 a year, and only 40 percent of farms with sales of $500,000 or more were operated as corporations in 1978." Corporate farms are concentrated in a few states—Hawaii, California, Texas, Louisiana, and Florida—and a few commodities such as fed cattle, sugar cane, poultry, canning crops, and nursery stock.

Other noteworthy changes between 1974 and 1978:

- Total land in farming declined less rapidly than in previous years.
- Harvested cropland as a percent of total farmland increased again—to 31.2 percent—but this rate slowed, too.
- The gap between farm and urban family income narrowed.
- The proportion of partnerships rose for the first time since the 1960's, suggesting more farmers are pooling their resources.

Exclusive Licenses to USDA Inventions

Private companies may now get exclusive licenses to manufacture and sell some products patented by USDA.

It's all part of a new strategy to speed scientific discoveries from the laboratory to the farm.

As in the past, new patents on products developed by USDA researchers will first be available to all private companies on a nonexclusive basis. However, if the patent is still sitting on the shelf after 6 months, officials will decide whether to offer the added incentive of an exclusive license.

"Companies often feel that without some license protection, they can't afford the developmental and startup costs to produce and sell a product competitively," says Anson Bertrand, USDA's director of science and education.

The exclusive license is intended to encourage companies to turn the results of government research into commercial products for public use.

The first "exclusive" has been granted to a chemical firm, Pennwalt Corp. of Philadelphia, to develop a product to control nematodes and other parasites. It will be based on a formula developed by scientists at USDA's Agricultural Research Center in Beltsville, Md.

"Nematode pests damage 7 percent of the nation's total crop production each year," Bertrand says. "At present values, that's a loss to farmers and consumers of about $3 billion."

Pennwalt's license gives the company exclusive patent rights for 5 years after the product is approved for sale by the government and for 5 years after the date of first sale in each licensed sales territory. These rights expire no later than June 30, 1989.

"I expect more and more companies will seek exclusive licenses to USDA's inventions," Bertrand says. USDA has about 1,200 patents available on inventions ranging from farm equipment to food proteins.

For more information on USDA patents and the licensing program, write to: Administrative Services Division, Program Agreements and Patents, Management Branch, USDA, Federal Bldg., 6505 Belcrest Rd., Hyattsville, Md. 20782. The publication listing USDA patents is titled *Patents Available for Licensing.*

Fighting Fires in Rural America

Fire—it's frightening wherever it flares up, but for rural dwellers it can be especially devastating.

A farm or other rural property hit by fire will probably sustain three to six times as much damage as an urban structure, according to the Insurance Information Institute in Washington, D.C. That record is reflected in higher fire insurance rates in rural areas.

Total fire losses in rural America are estimated at well over $1 billion annually. And that doesn't take into account the added expense to the community when it must provide emergency medical aid, food, and shelter to victims.

Fire losses have increased sharply because of rising property values and the movement of people back to rural areas, reversing the previous trend of migration to the cities.

The faster growth of rural areas has distributed the population more thinly—bad news to fire departments, which are hard-pressed to respond to fires occurring farther and farther from the station house.

Fire and lightning strike 2 out of every 100 farms each year, and over 400,000 fires hit rural structures and wild land last year. Volunteer fire departments in rural areas aren't equipped or trained to handle so many calls.

Some rural areas don't have firefighting facilities at all, while less rigid wiring and construction standards and poor heating equipment may increase the chances of fire in those areas.

"Statistics available on rural fire losses vividly point out the need for additional fire services," says L. A. Amicarella, director of the cooperative fire protection division of USDA's Forest Service.

Upgrading local firefighting facilities is largely the responsibility of rural communities, but some limited federal help has been available. The Rural Development Act in 1972 was strengthened by the Cooperative Forestry Assistance Act in 1978, which authorizes USDA to assist state foresters in organizing, training, and equipping local rural fire protection forces.

The law earmarked $7 million for rural community fire protection. Since 1975, $3.5 million has been allocated for this program. Over 500 new fire departments have been organized and thousands of firefighters trained through programs set up by state foresters.

For more information about the program, write: Cooperative Fire Protection, Forest Service, P.O. Box 2417, Washington, D.C. 20013. Ask for booklet FS-312, *How The Rural Community Fire Protection Program Can Help You.*

A Dial Away

A quick source of agricultural information is at your fingertips. Call the Farmers'—900—Newsline for the latest crop, livestock, export, and economic news from USDA.

A 60-second summary is available to you 7 days a week, 24 hours a day. Your cost is 50 cents per call.

The news items and special features shown below are added at 4 p.m., Washington, D.C., time on the scheduled dates. Dial 900-976-0404 (in some areas, dial 1-900).

Here's the schedule for January and February:

January

1,2,3	Farmers' Prices
4	Farm News Special
5	World Weather and Crops
6	Farm News Special
7	Vegetable Acreage
8,9,10	Turkeys
11	U.S. Crop Prospects
12	Farm News Special
13	1981 Fruit Summary
14	World Crop Prospects
15,16,17	World Supply/Demand Situation
18	Cattle on Feed
19	Sheep and Lambs on Feed
20	1981 Crop Summary
21	1981 Crop Values
22,23,24	Red Meat Production
25	Grain Stocks
26	World Supply/Demand Situation
27	Sheep and Goats
28	Soybean Situation
29,30,31	Cattle Inventory

February

1	Producer-Owned Grain
2	Wheat Situation
3	Agricultural Outlook
4	Farmers' Prices
5,6,7	Vegetable Situation
8	Sugar Situation
9	World Weather and Crops
10	World Crop Prospects
11	World Supply/Demand Situation
12,13, 14,15	Cattle on Feed
16	Livestock Situation
17	Export Outlook
18	1982 Prospective Plantings
19,20,21	Red Meat Production
22	Farm News Special
23	Eggs, Chickens, and Turkeys
24	Feed Situation
25	Farm News Special

Features are subject to change.

Crawfish Farmers Tap Growing Gourmet Market

Crawfish suggest fishbait—not gourmet dining—to most Americans. But it's on the plate, not on the hook, where the small, lobster-like crustacean is earning a reputation as a promising cash crop for some southern farmers.

Also known as crayfish and crawdads, crawfish thrive in fresh-water lakes and swamps across the country and around the world.

While already a delicacy in France and Scandinavia, crawfish are gaining popularity as a speciality food here. Louisianans have always savored crawfish bisque or stew, but now New York, Chicago, and Cleveland have become big markets for processed crawfish tails, according to Kenneth Roberts of the Louisiana Cooperative Extension Service.

The wild catch, which makes up about 50 to 70 percent of the total crop, is not enough to satisfy growing demand in the restaurant and food trade. For some farmers, that spells opportunity.

Several hundred farmers in Louisiana and Texas raise crawfish in cultured ponds and rice fields, and the idea is spreading northward through Mississippi and South Carolina.

"Louisiana farmers harvested about 28 to 30 million pounds of crawfish last season, which ran from November 1980 to last June," says economist Michael Stellmacher of USDA's Economic Research Service. "This harvest earned them about $25-$29 million. Texas farmers produced an additional 3 to 4 million pounds, worth around $5.5 million."

"There are about 60,000 pond acres in production in Louisiana, and 4,000 to 5,000 in Texas. Both the acreage and amount of production are increasing. Ten years ago, there were less than 20,000 acres in both states combined."

Raising crawfish is one way some farmers can stretch their resources. Crawfish are usually raised in ponds and are sometimes double-cropped with rice.

"A rotation system using crawfish, rice, and soybeans is in vogue right now."

"Double cropping has some problems," says Louisiana's Roberts. "It requires a lot more management. Rice planting needs to be carefully coordinated with the crawfish harvest. Also, some rice land requires periodic leveling that can interrupt the crawfish cycle."

"A rotation system using crawfish, rice, and soybeans is in vogue right now," Roberts says. "Under this system, the farmer harvests crawfish every 3 crops."

Culturing crawfish in ponds is another alternative. Although not every farmer with an idle pond on the back forty can produce crawfish, it can be profitable for some because of fairly low overhead. Only a small acreage is needed, and farmers generally don't have to restock the pond after the first year.

Also, crawfish don't require special food. They can live on pond and pasture grass, rice, or brown-top millet.

But there are drawbacks. Crawfish need good-quality water, and a pumping system is necessary to keep the water circulating and well oxygenated.

In addition, harvesting requires a lot of labor. The wire traps used to catch crawfish must be checked every day. Some farmers with ponds pay fishermen to bring in the crop, but they may end up short of help if the wild harvest is at its peak.

Record-High Prices

Despite its shortfalls, crawfish culturing can offer producers a good return on their investment. Last season, processors paid farmers a record-high 80 to 85 cents a pound for their catch, up about a quarter from a year earlier. Texas producers received more, $1.40 a pound, because they sold almost all their crop directly to restaurants and consumers.

Roberts estimates the cost to start a 100-acre pond system in Louisiana during 1980 was a little over $26,000, excluding land. Each acre produces an average of 600 pounds. So, at 85 cents a pound, a farmer could have grossed $51,000 in the first year. After expenses, taxable net earnings might be around $25,000, excluding the cost of hired labor for harvesting. Hired labor normally receives a 40-percent share of the profits. However, harvest returns vary from year to year.

"Prices were high in 1981 because of the drastically reduced wild catch from Louisiana's Atchafalaya Basin," Stellmacher says. "The water level in the Mississippi River didn't rise enough last fall, and the crawfish stayed in their burrows. Prices will probably be down this season if water levels are more typical, and there's a larger wild crop. However, the market should still be strong."

There's no difference in quality or price between wild and cultured crawfish. In fact, wild crawfish are frequently used to stock the ponds. Prices depend on the type of market and time of harvest, and not where the fish came from. Crawfish sold to restaurants and directly to consumers generally bring higher prices than those sold to processors. Also, prices are generally highest before the wild harvest begins.

"The crawfish producers and the aquaculture industry as a whole are very optimistic right now," Stellmacher says. "But we'll have to wait and see how things turn out." □

*[Based largely on information supplied by ERS economist Michael Stellmacher and material published in ERS' **Aquaculture Outlook and Situation** report.]*

How Effective Are Marketing Orders?

It isn't every day that producers rise to defend government regulation, but many fruit and vegetable growers have done just that in response to criticism of federal marketing orders.

Although marketing orders are legally binding, they're unlike most government regulations because they can be imposed only if requested by the producers themselves.

During the last decade, an average of 46 marketing orders have covered a wide range of fruits and vegetables each year. Right now, 47 marketing orders are in effect for 33 of the commodities.

The orders regulate the amount or quality (and sometimes both) of a commodity that can be marketed. They can affect all growers or just those in a certain producing area.

Many producers favor the orders for their own security. Basically, marketing orders are given credit for helping to stabilize farm prices both within season and from year to year, helping to ensure fair returns for producers, and helping to provide a steady supply of the product to consumers.

However, critics contend that the orders give producers too much market power, permitting them to exploit buyers and, ultimately, consumers.

Who's Right?

No one knows for sure what would have happened to farm or consumer prices over the years if marketing orders had never existed. But at least one analyst, USDA's Ed Jesse, has studied grower prices received for fresh produce, comparing commodities marketed with orders and those marketed without them over the last 30 years. The difference in price: none.

"Farm prices were just about the same for similar and, in some cases, identical commodities sold with and without marketing orders," says Jesse.

In his study, Jesse considered two types of commodities: those fully covered by marketing orders and those where only part of the crop was marketed under orders. He then compared the prices for both types of commodities with prices for commodities not covered by any orders.

Fresh tomatoes, for example, were partially covered by orders during the test period. So, the actual farm prices for order tomatoes and nonorder tomatoes marketed at the same time could be compared. "No distinguishable price differences were found," Jesse says.

The test was not as simple for commodities that had 100-percent order coverage. California almonds and walnuts are good examples. Both these specialty crops are regulated by the strongest type of marketing orders—ones that limit both the quality and quantity of the nuts sold for the entire U.S. crop.

For walnuts and almonds (and other commodities completely covered by orders), Jesse looked at prices as a percentage of parity. For example, in 1980, the actual grower price of almonds was 71 percent of the parity price.

Then, Jesse compared these parity percentages for ordered commodities with those for similar commodities. Again, he found no real differences.

The Price Stability Question

Jesse also conducted tests to determine if farm prices for commodities covered by marketing orders were any more stable than prices for those with no orders.

He even compared the strongest orders (those that controlled 100 percent of the domestic crop) with the weakest (those with very limited power). "The price variability patterns were pretty much the same," Jesse says.

He did find that producers of commodities plagued by extreme price fluctuations were more likely to have asked for orders. And Jesse adds: "Farm prices might have been even lower and more volatile without orders. Our tests did not address that possibility."

Jesse's study did not look beyond grower prices, so he acknowledges that marketing orders could possibly influence processor or retailer margins, thus affecting prices at the end of the marketing chain. But that remains to be proven.

"Critics' charges that consumers are hurt by higher prices attributable to orders are questionable," Jesse says. "They may simply be overestimating the orders' effectiveness in meeting their legislative goals."

If the orders have not significantly enhanced grower prices or improved price stability, then why do producers support orders? "The reasons may not be directly related to price," Jesse says.

"Orders allow producers to get more involved in marketing their crops." Producers serve on boards that make decisions on the quality and quantity of their commodities that can be sold under order. And, quality standards have helped to build reputations for some fruits and vegetables. "With quality-control orders, buyers have a better idea of what kind of produce they can expect to receive."

"Also, efficiency through standardization is easier to attain for commodities regulated by marketing orders. Uniform packs and containers for some vegetables are an example," Jesse says.

"Finally, orders are a way to get all producers to share the costs of conducting research and advertising their products". □

[Based on information provided by Edward V. Jesse and material published in ***Effectiveness of Federal Marketing Orders for Fruits and Vegetables*** *(AER-471), by Edward V. Jesse and Aaron C. Johnson, Jr.]*

U.S. Cotton Helps Fuel Asian Textile Boom

Since the mid-1960's, cotton has become vital to the economic expansion of developing Asia.

For a U.S. cotton industry facing lean times at home, this was a timely development. Synthetic fiber use had increased rapidly here because of better durability and cheaper, less variable prices compared to cotton. As a result, domestic cotton consumption sharply declined, and producers were looking for alternative outlets for their raw cotton. They found them in Asia.

Textile manufacturing and exports have been viewed by the governments of developing Asian countries as a rapid way to industrialize. For getting populations out of the fields and into the factories, textile manufacturing has many advantages, says economist Dave Young of USDA's Economic Research Service:

- The level of technology needed is within reach of the developing countries.
- Relatively little capital is needed to set up textile plants compared with the costs of starting other industries.
- The industry uses a lot of labor, which helps solve unemployment problems.
- Due to lower costs of production in developing nations, they hold a comparative advantage in textile production and exports.

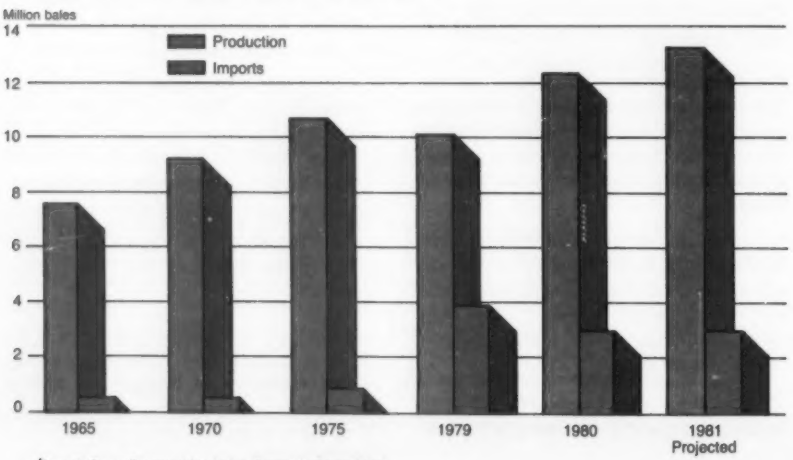
A prime example of how emphasis on textiles can be a successful road to industrialization is the economic growth of Japan.

Thirty years ago, textile manufacturing was the major Japanese industry. Today, through continuing economic development, textile exports account for only 4 to 5 percent of Japan's total exports, as more technologically-advanced electronic items, engineering products, and cars have taken over.

Dependence on Imports

While the capacity to manufacture textiles is within reach of the developing Asian countries, the resources to produce enough raw cotton are not. Production is lagging behind demand in nearly every Asian country. In fact, very little cotton is grown in developing Asia outside of China, India, and Pakistan.

China Is Asia's Second Largest Importer of Cotton, Even Though Production Is Growing Steadily[1]



[1]Imports from all sources beginning August 1 of year listed.

In the 1980/81 crop year, China was the second leading cotton producer in the world with a crop totaling 12.4 million bales. That year, the world's leading producer was the USSR with 14.3 million bales. The U.S.—traditionally number one—was hampered by a drought and only produced 11.1 million bales to finish third.

"Even though China is one of the world's top producers of cotton, the demand generated by its expanding textile manufacturing industry dwarfs its domestic output," Young says.

Although cotton supplies are critical to the economies of many Asian nations, more cotton is not produced because farmland is very limited. For the farmland which is available, food is given top priority. Since food is also in short supply, this leaves very little land for cotton.

Some progress is being made, however. In Thailand, cotton output has expanded significantly over the last few years, as the government emphasizes cotton production in order to limit cotton imports. Recently, cotton production has also increased in Bangladesh, the Philippines, and Indonesia.

But overall, the growth of the textile economies in most of the developing Asian nations hinges significantly on imports of cotton.

Push for Industrialization

A surge in demand for cotton began about 15 years ago, with the push for industrialization in developing Asia.

Since the mid-1960's, cotton imports have grown an average 76,000 bales per year in Korea, 44,000 bales in Taiwan, and 21,000 bales in Indonesia.

Cotton imports by China have shown the most phenomenal growth pattern. The per-year gain since the mid-1960's averages 167,000 bales even though Chinese cotton imports didn't really begin to rise until 1972.

By far, the largest cotton supplier to the region is the U.S., with a 45-percent average share of the Asian market. The U.S. is also the world's largest exporter of cotton with a 34-percent share of the market, followed by the USSR with a 19-percent share.

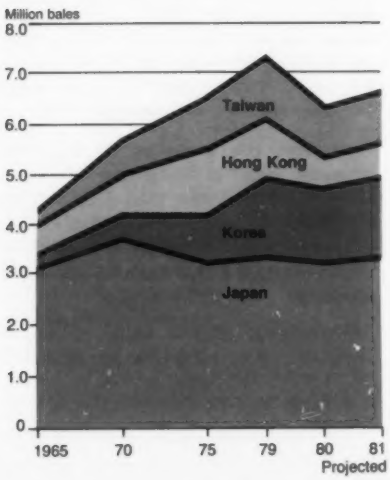
The U.S. share of the Asian cotton market in 1980/81 ranged from a little more than one-third in Japan to about 90 percent in Korea.

Likewise, Asia is overwhelmingly the largest purchaser of U.S. cotton. In fiscal 1980, Asian markets took nearly 83 percent of all U.S. cotton exports, up from 78 percent in 1979. The leading purchasers among Asian nations for U.S. cotton have been Japan, Korea, Taiwan, Hong Kong, and most recently China.

Japan was perennially the largest buyer of U.S. cotton until 1979/80 when China took over the number one position.

In the 1980/81 marketing year, the Japanese imported 1.1 million bales of U.S. cotton, down from 1.6 million bales the year before. For 1981/82, Young says the Japanese should increase their imports from the U.S.

Japan Is Asia's Biggest Cotton Importer, But Korea's Imports Are Growing Fastest[1]



[1]Imports from all sources beginning August 1 of year listed.

Other Customers

The South Koreans, whose textile exports represent their largest foreign exchange earner, imported 1.3 million bales of U.S. cotton in 1980/81, down from the 1.5 million purchased the year before. Young expects Korea's imports of U.S. cotton to increase this season as the Korean textile economy expands.

Taiwan took about 350,000 bales of U.S. cotton in 1980/81, compared with about 725,000 in 1979/80. Imports from the U.S. in 1981/82 are expected to increase.

U.S. cotton sales to Hong Kong totaled about 205,000 bales last season, down from about 635,000 in 1979/80. Young predicts Hong Kong may increase its imports this season.

The Chinese took their time entering the U.S. cotton market, but when they did their presence was quickly felt.

China's imports of U.S. cotton grew from an average of nearly 360,000 bales per year from 1970-1974, to about 650,000 bales in 1978/79. In 1979/80, China imported a record of nearly 2.3 million bales from the U.S., but the total fell to below 1.4 million in 1980/81. Young says U.S. farmers can possibly look forward to the Chinese buying slightly more cotton in 1981/82.

He notes that imports for all Asian countries dropped from 1979/80 to 1980/81, but there is no cause for alarm.

"The 1979/80 season was a highly unusual year for cotton sales, due to the sharp jump in imports by China, abnormally high demand for textiles and apparel world-wide, and strong world economic growth."

Young contends that the U.S. should maintain its large share of the Asian cotton market because of some big advantages. First, the U.S. offers a wide variety of quality cotton grades, usually at competitive prices.

Second, U.S. cotton is usually delivered on time, aiding foreign textile mills in their production plans. Third, textile mills are long accustomed to working with U.S. cotton and desire the continuity. These factors, along with the large U.S. crop this season, should allow the U.S. to increase its share of Asian cotton imports in 1981/82. □

[Based on information supplied by ERS economists Dave Young, William Coyle, and Susan Libbin.]

Exports Up, But Prices Down

Growing Asian demand, large U.S. supplies, and competitive prices will boost U.S. cotton exports this season, but total use will still fall short of production.

The 1981 U.S. cotton crop is estimated at 15.6 million bales, a 41-percent increase over the 11.1 million bales produced in 1980.

"This is the largest crop since 1953, when cotton output reached 16.5 million bales," says economist Sam Evans.

At the same time, slow economic activity in the U.S. and in major foreign textile markets will limit increases in cotton use this season, he says.

With production exceeding use, stocks at the end of the 1982 crop year could reach 5.4 million bales, double last year's carryover.

According to Evans, the prospective crop buildup is affecting cotton prices. "Cotton prices have been declining for several months," he says. "As of early-November, prices were running a third below a year earlier."

For Many Water Users, An Era of Conservation Begins

For decades, many U.S. farmers have enjoyed access to seemingly unlimited supplies of water. With it, they've increased yields and grown crops where nature doesn't provide enough precipitation.

That era is drawing to a close. Growers are having to break their old irrigation habits and think conservation, says economist Roger Strohbehn of USDA's Economic Research Service.

Around the country, but especially in the West, ground water supplies are declining after decades of intensive use by farms, industries, and cities.

Today's water problems in the West and the Great Plains stem primarily from irrigation. Example: Farmers apply about 1,600 gallons of water to produce a pound of cotton in Arizona—a crop that wouldn't grow there without irrigation.

The traditional flood irrigation method requires that more water be applied than the plants need—the only way to get the water across a large field.

Of the 178 million acre-feet used in irrigation in 1975, only two-fifths were actually consumed by crops. (An acre-foot is enough water to cover 1 acre 1 foot deep—or about 326,000 gallons.) The rest returns to streams through surface runoff—becoming available to other users—or percolates deep into the soil past plant roots, or evaporates.

Although water is also claimed by evaporation in sprinkler irrigation, this method is more efficient than flooding because percolation losses are reduced.

Multiplying Demands

By all accounts, ground water supplies are still ample in many areas and, even at the present level of use, should last well into the next century. But demand for ground water and surface water is multiplying rapidly.

In past years, higher farm prices generated by increased exports encouraged farmers to bring into use more land requiring irrigation.

The western states that require so much water for irrigation may also be hosting energy and defense projects that depend on large amounts of water.

Coal will be another competitor for water in the West. Coal producers mix water with mined coal to transport it in the form of slurry. And the proposed "synfuel" plants would claim more water to produce liquid fuel from coal.

The increasingly thirsty western and southwestern cities are other big users. With limited water supplies, decisions will have to be made on who gets water, and how much. In many cases, economic forces will make the decisions, says Strohbehn.

The market value of water will direct more of it to industry and the cities and less to farming unless state and local governments decide that community benefits from agricultural water use are more important, Strohbehn says. Farmers can't be blamed for wondering how much longer there'll be enough water to go around.

The Farm Share

Traditionally, farming has gotten a healthy share of the nation's fresh water supply, accounting for a third of the water withdrawn from surface and ground supplies. About 98 percent of that goes for irrigation. Irrigated acreage grew from 30 million in 1954 to 51 million in 1978, according to the Census of Agriculture.

About half of the water farmers use for irrigation comes from their own land—40 percent from ground water sources. For the irrigation farmer who doesn't have accessible surface water and who is not near water brought in by government projects, ground water pumping is the only alternative.

Large Acreages of Some Crops Draw on Declining Water Supplies

	Acreage in ground water decline areas[1]	% of total acres harvested[2]
	acres	*percent*
Alfalfa	947,000	3.4
Barley	329,000	3.6
Cotton	2,5[illegible],000	20.8
Corn	4,382,000	5.5
Citrus	200,000	15.8
Grapes	206,000	28.9
Sorghum	2,191,000	13.9
Peanuts	52,000	3.4
Rice	425,000	14.3
Wheat	2,096,000	3.7

[1]Areas with at least one-half foot average annual decline.
[2]Includes irrigated and nonirrigated acres. From 1978 "Agricultural Statistics."

Fortunately, while the Great Plains and the Southwest don't have the surface water that other regions enjoy, they're blessed with many natural ground water reservoirs. These underground formations of sand, gravel, and silt—called aquifers—are saturated with billions of gallons of water.

Since the development of high volume turbine water pumps 40 to 50 years ago, farmers have been able to irrigate from these aquifers. More efficient pumps, more powerful motors, and center-pivot irrigation have allowed ground water irrigated acreage to increase.

But, with the increase in irrigated acreage, water is being removed from some aquifers faster than they can be recharged by nature. In the Great Plains, only ½ inch to 3 inches of the 12 to 22 inches of rainfall a year seep back into the aquifers.

The biggest of the aquifers is the Ogallala, lying under large areas of

Kansas, Nebraska, Oklahoma, Texas, Colorado, and New Mexico. Over 200,000 wells tap the aquifer to irrigate 12 to 15 million acres.

The water table decline in the Ogallala ranges from one-half foot a year in some areas up to 5 feet in others. At that rate, economically usable supplies in much of the Ogallala area could be depleted by the middle of the next century.

About 32 million acres are irrigated with ground water in the U.S., according to USDA economist Gordon Sloggett, who works out of Oklahoma State University at Stillwater. He says ground water levels under 15 million of those acres are in chronic decline—defined as dropping at least one-half foot per year.

Reduced Well Yields

Farmers can see the evidence of the diminishing supplies at the pumphead. As water levels retreat, some well yields become too small for irrigation. Other wells are drawing water at slower rates and have to lift it farther to the surface, driving up energy costs.

Energy costs for pumping could prevent a farmer from using water right under his feet. "There's not a water shortage," says USDA economist Charles V. Moore at the University of California, Davis. "We have a shortage of cheap water."

Increasing natural gas and electricity costs have already reduced irrigated acreage in Texas and forced some farmers to use more efficient irrigation techniques.

The logical course of action for producers faced with falling water tables, increased energy costs, or both, is to draw less water, extending the life of the underground reserves. But it's not always that simple.

Farmers who depend on ground water supplies can easily find themselves locked into dependency on a volume of water that requires heavy pumping, according to Moore.

Here's why: A farmer will buy machinery based on an expected crop acreage, which is in turn based on an expected supply of water. In order to pay off loans to buy the machinery, a certain cash flow, based on the irrigated acreage, is required. So if pumping is reduced, irrigated acreage must also be reduced, putting the operator in a cash flow bind, Moore says.

According to Sloggett, the nature of ground water rights in some states also discourages producers from conserving. The holder of ground water rights must put the ground water to "beneficial use" or lose the rights.

Seeking Solutions

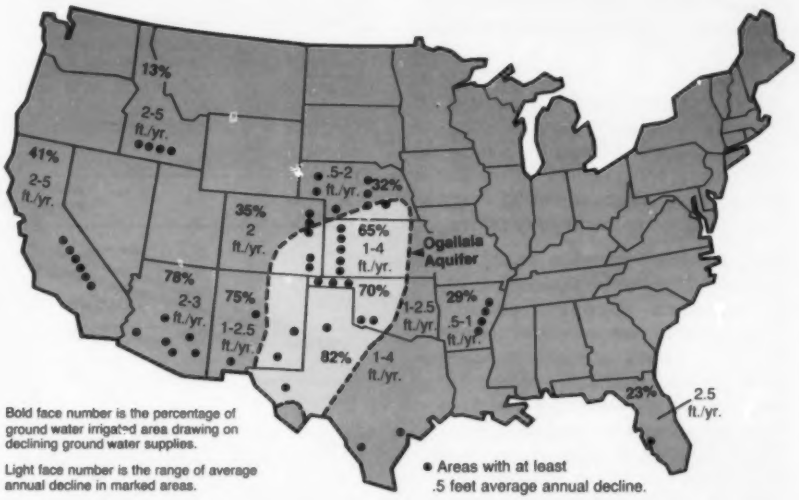
While the declining level of ground water is cause for concern, a report by Sloggett suggests that there's enough time to seek out solutions.

The report focuses on 11 states where the problem is the worst: Arkansas, Arizona, California, Colorado, Florida, Idaho, Kansas, Nebraska, New Mexico, Oklahoma, and Texas. Ninety percent of the 32 million acres irrigated with ground water in 1977 was in these states.

In the report, drawing on a U.S. Geological Survey study and USDA sources, Sloggett says that in 53 percent of the irrigated areas within these states, ground water has been declining at least one-half foot a year. The problem is greatest in Texas, where 82 percent of the irrigated areas show ground water decline.

At least 10 percent of the U.S. acreage for five crops (cotton, citrus, grapes, grain sorghum, and rice) is grown in these declining ground water areas. Cot-

Ground Water Decline Worst in Great Plains States



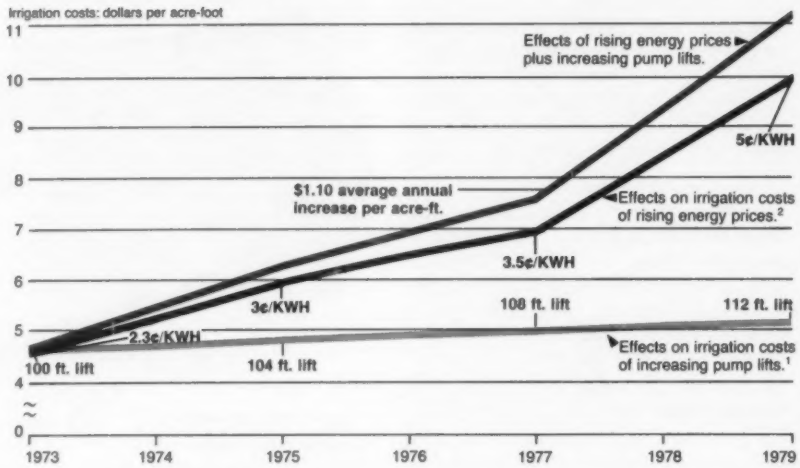
ton, 71 percent of which is produced in Arizona, Texas, and California, is the most vulnerable.

In areas where ground water levels are declining, irrigators are having to spend more on energy to lift it out of the ground. But, according to the Sloggett report, pumping costs will be affected more by rising energy costs—well over the general rate of inflation—than by the added costs of higher lifts, and neither of these factors affects profits as much as the fluctuation in commodity prices.

The long-term problem in the areas studied is the inevitable depletion of the underground supplies, which will necessarily reduce the irrigated acreage. That's already happening, although very gradually, on the Texas High Plains. It's estimated that 57 percent of the available ground water supply in this area will be gone by the year 2020.

Arizona, Kansas, New Mexico, and Oklahoma will also be hit hard by declining levels. In all four of these states, at least 65 percent of the acreage irrigated by ground water is affected.

Higher Irrigation Costs Reflect Rising Energy Prices More Than Increasing Pump Lifts



[1]Assumes constant energy prices (2.3¢/KWH).
[2]Assumes constant 100-ft. pump lift.

Dryland Farming

What will farmers in these areas have to do to stay in crop farming? They have several options, according to Sloggett. The most obvious is to convert to dryland farming.

In all of the states except Arizona and California, wheat producers could raise a wheat crop without irrigation, although their yield would of course be less. Some producers in areas where depletion is most serious have already made the switch.

But that strategy wouldn't work with corn or alfalfa (except in Nebraska), since these crops require more rainfall than the area receives. Those producers would likely turn to dryland grain sorghum or wheat.

Producers in the desert regions of Arizona, California, and New Mexico would be hurt most by depleted ground water. They would be unable to grow any crops without irrigation. The same is true for California citrus and grape producers. These lands would become pastureland or, at the worst, revert to desert.

Irrigation farmers facing declining water supplies have other options. One is the use of more efficient irrigation techniques, such as drip irrigation or laser leveling. They can also substitute crops that require less irrigation, such as wheat rather than corn or alfalfa.

Sloggett emphasizes that while the situation is serious, it is not immediately critical. Ground water is declining slowly enough for producers to make these adjustments gradually and possibly for other regions with enough water to pick up the lost production.

While growers have these production options and can employ a number of water conservation techniques, Strohbehn and Sloggett agree that economic forces and the cost of energy may cause reduced ground water use before depletion occurs.

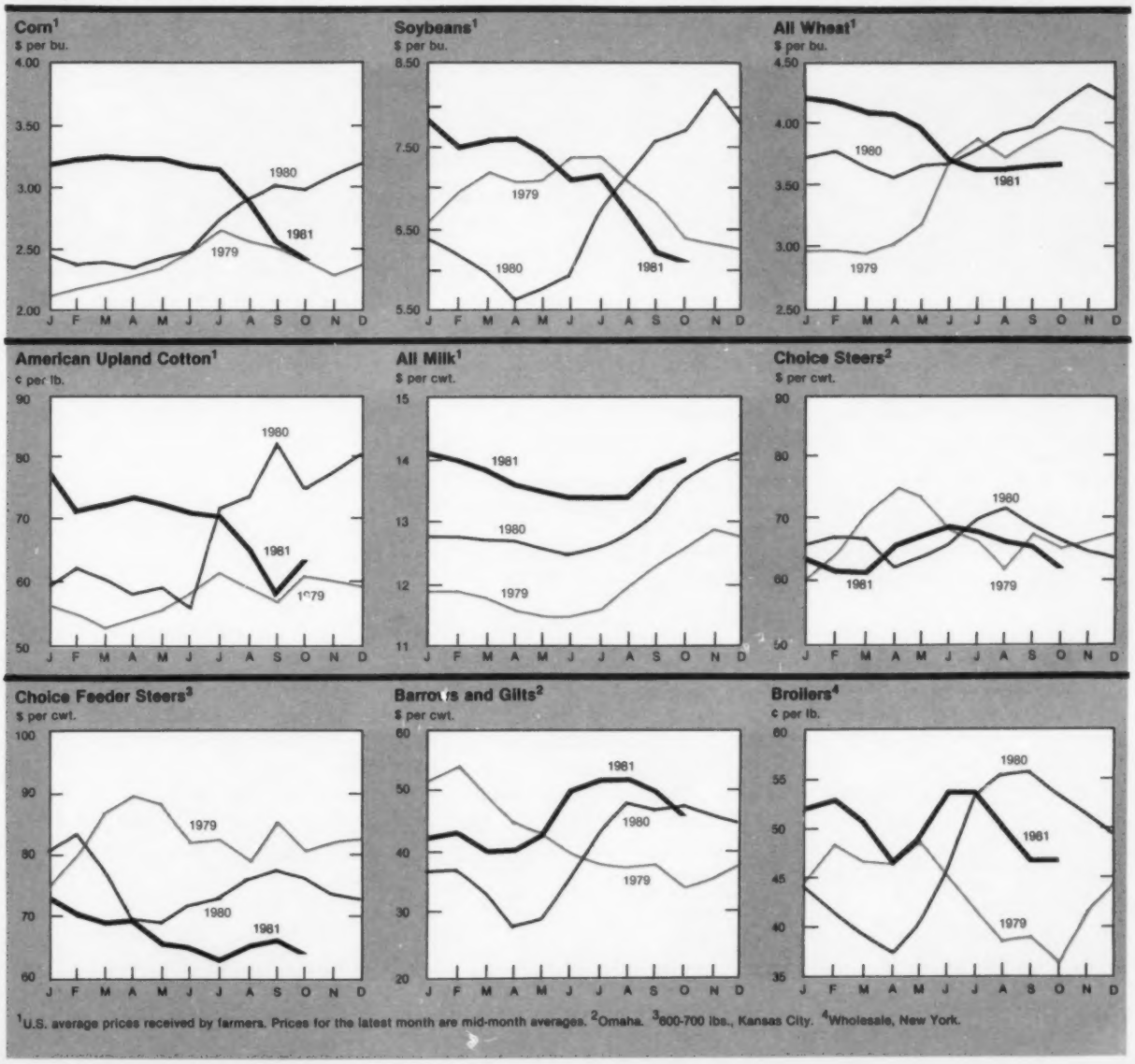
According to Strohbehn, the challenge facing communities and states with declining ground water supplies is to determine when and for what purposes the limited water supplies should be allocated. □

[Based on information supplied by ERS economists Charles V. Moore, Gordon Sloggett, and Roger Strohbehn.]

FARMLINE TRENDS

Monthly Price Monitor

Mid-October cotton prices picked up after sliding since spring. Milk also rose, hitting the $14 mark, and was the only major commodity above year-ago levels. Corn and soybeans continued to fall, with both at their lowest levels since summer 1980. Wheat prices have been stable since July. Kansas City Choice feeder steers dropped—to $12 below October 1980 levels. Omaha Choice steers have fallen more than $6 since June. New York broiler prices were unchanged from last month, while Omaha barrows and gilts dropped below year-ago prices for the first time since May 1980.



[1]U.S. average prices received by farmers. Prices for the latest month are mid-month averages. [2]Omaha. [3]600-700 lbs., Kansas City. [4]Wholesale, New York.

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